Linear Equation

The general Formula for Linear Equation is

Y = mx + C

Examples of Linear Equation

a) $y = mx + c$
b) $y = 2x + 10$
c) $y = -x + 5$
d) $k = 3t + 4$

Solving Linear Equation

Example:

Given the formula $2m = 3p + 1$, find the value of m if the value of p=4?

Solution

$$2m = 3(2) + 1$$
$$2m = 7$$
$$m = 3.5$$

Question:

Given the formula $m = 3p + 1$, find the value of p if the value of m=10?

Question:

Given the formula $y = 4p + 1$, find the value of p if the value of y =-5?

Question:

Given the formula $k = 3x + 1$, find the value of k if the value of x= -3?

Question1

Solve the following Equation

$$3p + 50 = 2p + 10$$

Find the value of 'p'?

Solution:

$$3p - 2p = 10 - 50$$
$$p = -40$$

Question 2

Solve the following equation when the value of x = 3

$$y = 3x + 14$$

Solution

$$y = 3(3) + 14$$
$$y = 9 + 14$$
$$y = 23$$

Question 3

Solve the equation when $2y = -40 + 6p$

Solution

$$2y = -40 + 6y$$
$$2y - 6y = -40$$
$$-4y = -40$$
$$y = 10$$

Linear Equation

Solve the equation

a) $k = -14 - k$

Answer $k + k = -14$

$2k = -14$

$k = \frac{-14}{2}$

$k = -7$

b) $f + \frac{3}{2}(6 - 4f) = -31$

Answer $f + 9 - 6f = -31$

$f - 6f = -31 - 9$

$-5f = -40$

$f = \frac{-40}{-5}$

$f = 8$

Solve the equation

1. Solve each of the following equations:

a) $3k - 2 = 8 + k$

Answer $3k - k = 8 + 2$

$2k = 10$

$k = \frac{10}{2}$

$k = 5$

b) $x + 8 = 5$

Answer $x = 5 - 8$

$x = -3$

c) $m = -20 - m$

Answer $m + m = -20$

$2m = -20$

$m = \frac{-20}{2}$

$m = -10$

1. Solve each of the following equations:

a) $x + 8 = 5$

b) $m = -20 - m$

c) $4p - 9 = p$

d) $\frac{5n}{4} = 20$

e) $\frac{3y}{8} = \frac{1}{2}$

f) $3k - 2 = 8 + k$

g) $4a + 3 = 9 - 2a$

h) $p = -2(3 - p)$

More Tough Questions

Question

1. $2x-34=-20$	Sol: $x=7$	2. $9x+8=7x+6$	Sol: $x=-1$
3. $4x+3=3x+5$	Sol: $x=2$	4. $7x+9=3+9x$	Sol: $x=3$
5. $x-8=2x-11$	Sol: $x=3$	6. $x+1=2x-7$	Sol: $x=8$
7. $6x+6=4+8x$	Sol: $x=1$	8. $9+9x=17+5x$	Sol: $x=2$
9. $2x+3=3x$	Sol: $x=3$	10. $25-2x=3x+20$	Sol: $x=1$

Try out yourself.

a) $3x = x + 10$
b) $4x + x = 10 - 5$
c) $5x + 4 = 3x + 15$
d) $6x + 14 = 3x + 15$
e) $5x + 42 = 2x + 5$
f) $6x + 4 = 3x + 13$
g) $57 - 52 = 3x + 15$
h) $5x - 8 = 3x + 17$
i) $8x - 81 = 4x - 19$
j) $7x + 8 = 3x - 17$
k) $10x - 18 = 4x + 17$

More Complicated Questions

Example 1: $2(2+4x)=3+12x$ Find the value of x? $2(2+4x)=3+12x$ $4+8x=\ 3+12x$ $4-3=12x-8x$ $1=4x$ $x=\frac{1}{4}$	Example 1: $5x=7(5x-3)+3$ Find the value of x? $5x=35x-21+3$ $21-3=35x-5x$ $18=30x$ $x=\frac{18}{30}$ $x=\frac{3}{5}$

Question

1. 10x-15=4x+27	Sol: x=7	2. x-3(x-2)=6x-2	Sol: x=1
3. 3x+1=6x-8	Sol: x=3	4. 3x-7=2(x+1)	Sol: x=9
5. 47-3x=5+11x	Sol: x=3	6. 2(2+4x)=3+12x	Sol: x=1/4
7. 30-9x=-7x+21	Sol: x=9/2	8. 5x=7(5x-3)+3	Sol: x=3/5
9. 3x-10=2x+1	Sol: x=11	10. 2(x-5)=3x-17	Sol: x=7

More Complicated Questions

Example 1: Find the value of x? Cari nilai x? $2x-\frac{x+x}{4}=\frac{2x+10}{8}$ Solution: $2x-\frac{x+x}{4}=\frac{2x+10}{8}$	$2x\times 8-\frac{x+x}{4}\times 8=\frac{2x+10}{8}\times 8$ $16x-(2x+2x)=2x+10$ $16x-4x=2x+10$ $12x-2x=10$ $10x=10$ $x=1$

Question

1. $x - \frac{3x}{4} = \frac{x}{7} + 3$

2. $2\left(\frac{x+5}{3}\right) = x + 3$

3. $\frac{9x}{4} - 6 = \frac{2x}{3} + \frac{1}{3}$

4. $\frac{5x}{6} - \frac{3x}{4} = x - 11$

5. $\frac{3x}{5} - 7 = \frac{2x}{6} + 1$

6. $x - 10 = \frac{5}{9}(x - 6)$

7. $\frac{x}{3} + x = 10 + \frac{2x}{9}$

8. $\frac{3x}{2} + 1 = 12 - \frac{x}{3}$

Answer

1. $x=28$; 2. $x=1$; 3. $x=4$; 4. $x=12$; 5. $x=30$; 6. $x=15$; 7. $x=9$; 8. $x=6$

Linear Equations With Ratio

Question 1

Solve the following

1. $\frac{x}{2} = \frac{3}{4}$ $ans: x = 1\frac{1}{2}$
2. $\frac{x}{3} = \frac{1}{4}$ $ans: x = \frac{3}{4}$
3. $\frac{x}{4} = \frac{2}{5}$ $ans: x = 1\frac{3}{5}$
4. $\frac{x}{5} = \frac{4}{5}$ $ans: x = \frac{4}{5}$
5. $\frac{x}{6} = \frac{5}{6}$ $ans: x = \frac{5}{6}$
6. $\frac{x}{7} = \frac{3}{8}$ $ans: x = 2\frac{5}{8}$

Question 2

Given the ratio, Find the value of x ?

1. 2 : x = 3 : 5 $ans\ x = 3\frac{1}{3}$
2. 1 : x = 1 : 5 $ans\ x = 5$
3. 5 : x = 8 : 2 $ans\ x = 1\frac{1}{4}$
4. 6 : x = 5 : 4 $ans\ x = 4\frac{4}{5}$
5. 2 : x = 4 : 8 $ans\ x = 4$
6. 8 : x = 4 : 1 $ans\ x = 2$
7. 7 : x = 1: 5 $ans\ x = 35$
8. 2 : x = 1 : 3 $ans\ x = 6$

Question 3

Given the ratio, Find the value of x ?

1. 2 : x+2 = 3 : 5 $ans\ x = 1\frac{1}{3}$
2. 1 : x+3 = 1 : 5 $ans\ x = 2$
3. 5 : x +4= 8 : 2 $ans\ x = -2\frac{3}{4}$
4. 6 : x+ 5 = 5 : 4 $ans\ x = -\frac{1}{5}$

Simultaneous Equation and Exercises

Question 1

Solve the following equation

$x + y = 20$

$x - y = 2$

Solution:

$$x + y = 20 \ldots\ldots\ldots\ldots\ldots\ldots (1)$$
$$x - y = 2 \ldots\ldots\ldots\ldots\ldots\ldots (2)$$
$$From\ (1)$$
$$x = 20 - y \ldots\ldots\ldots\ldots\ldots\ldots (3)$$
$$Subs\ 3\ into\ 2$$
$$20 - y - y = 2$$
$$20 - 2y = 2$$
$$20 - 2 = 2y$$
$$y = 9$$
$$When\ y = 9$$
$$x = 20 - 9$$
$$x = 11$$

Question:

Solve the following simultaneous equation

a) $y = x + 4$, $y = 2x + 3$

b) $y - 2x = 4$, $3x = y + 1$

c) $\frac{y}{2} - x = 2$, $6x = 2y + 2$

d) $x = 2y + 4$, $x = 3y - 1$

e) $\alpha + 2\beta = 7$, $\beta + \alpha = 4$

Answer:

a) $x = 1$ and $y = 5$

b) $x = 5$ and $y = 14$

c) $x = 5$ and $y = 14$

d) $x = 14$ and $y = 5$

e) $\alpha = 1$ and $\beta = 3$